Preliminary Street (P-Street)

CHIP SEAL

4.6 BITUMINOUS SEAL COAT (Chip Seal): Bituminous surface treatments (chip seals) shall be applied to the road surface only upon approval of the City Engineer. The bituminous surface treatment shall consist of an application of bitumen covered with mineral aggregate and rolled to a smooth surface presenting an even texture. The materials used in the application of the bituminous surface treatment shall be mineral aggregate and bituminous material.
The roadway shall be prepared to the proper cross section with compacted road-base according to the Kanab City Design Standards in preparation for the chip seal installation.

4.6 (A) BITUMINOUS MATERIALS:

Base Layer – Prime coat, MC-70 The bituminous material base layer shall be applied at a rate of 0.20 to 0.30 gallon per square yard as determined by the Engineer. The surface shall be allowed to dry for a period of not less than 48 hours without being disturbed, or for such additional period of time as may be necessary to attain penetration into the foundation course and drying out or evaporation of the volatiles from prime material, which period shall be determined by the Engineer.

First Application – MC-3000R this first application of cut back asphalt shall be applied at a rate of 0.45 gallon per square yard. A ¾" washed aggregate chip shall be placed at a rate of 280-300 tons per mile for a 28 foot width.

Second Application – MC-3000R this second application of cut back asphalt shall be applied at a rate of 0.40 gallon per square yard. A ¾" washed aggregate chip shall be placed at a rate of 280-300 tons per mile for a 28 foot width. The aggregate chips may need to be cut back if road conditions warrant as determined by the Engineer.

Third Application – MC-3000R or LMCRS-2 Emulsion a third application layer shall be applied after a minimum of 30 days after the city engineer or his representative has determined that

the first two layers have cured. This third application of cut back asphalt or emulsion shall be applied at a rate of 0.40 gallon per square yard. A ½" washed aggregate chip shall be placed at a rate of 100-150 tons per mile for a 28 foot width. Compaction runs shall be made continuously during the chip seal operations and for an additional two (2) hours after the chip seal procedures have been completed. Compaction can continue into the next day if conditions warrant.

4.6(b) AGGREGATE (CHIPS): Mineral aggregate shall consist of crushed stone or crushed gravel, free from adherent films of clay or dust, and shall be of such nature that a thorough coating of the bituminous material shall be determined by the Engineer.

The gravel or rock shall have a percent of wear not greater than 30 when tested by the Los Angeles Abrasion Test (AASHTO T-9 ASTM C 131). Chips shall be cubical or pyramidal in shape with at least 95% fractured faces. The crushed aggregate shall have a weighted percent of loss not exceeding 10% by weight when subjected to five cycles of sodium sulfate and tested in accordance with AASHTO Designation T-104.

Stripping tests of the mineral aggregate which the contractor proposes to use shall be furnished the Engineer before crushing operations begin. During the crushing of the aggregate, additional stripping tests shall be furnished to the Engineer upon his request. No stripping test shall show a percent stripping greater than 10 for CRS-2 asphalt. The chip shall be electrically compatible to the asphalt emulsion used.

The crushed aggregate shall conform to the gradation requirements shown in Tables 4.6.1 & 4.6.2 for ¾" and ½" aggregate chips, respectively.

Sieve Size	Percent by Weight Passing (ideal)	Ideal Gradation Tolerance (percent)
¾ inch	100	0
3/8 inch	85	+/- 5
No. 4	10	+/- 5
No. 8	2	+/- 2
No. 200	0.5	+/- 0.5

Sieve Size	Percent by Weight Passing (ideal)	Ideal Gradation Tolerance (percent)
½ inch	100	0
3/8 inch	95	+/- 5
No. 4	10	+/- 5
No. 8	2	+/- 2
No. 200	0.5	+/- 0.5

The initial mineral aggregate used for the production of chips shall be retained on a 5/8 inch sieve prior to being crushed to the gradation specified.

The aggregate shall be evenly spread at a quantity of 15 to 20 pounds per square yard of surface area. Upon commencement of the work and during it's progress, the individual quantities of bitumen and aggregate may be varied to meet specific field conditions, as directed by the Project Engineer.

An adequate supply of aggregate shall be available on the job site to permit continual
spreading operations.

4.6(c) EQUIPMENT: All tools, equipment and machines used in the performance of the work shall be subject to the approval of the Project Engineer and shall be maintained in satisfactory working conditions at all times.

4.6(d) ASPHALT DISTRIBUTOR: The asphalt distributor shall be equipped with a calibrated dipstick marked in gallons per inch of length, and an accurate thermometer and speedometer. The distributor shall also be capable of maintaining proper pump pressure to ensure a uniform distribution of asphalt at all times. The pump shall be able to maintain the correct pump speed or pressure without either atomizing the asphalt or distorting the spray fan.

However, the pump shall be able to maintain a pressure which shall be sufficient to prevent streaking from a non-uniform discharge of material from the individual nozzles.

The asphalt distributor shall be equipped with a rear-mounted spray bar capable of covering widths of six to 15 feet in a single pass. The distributor tank shall be well insulated and be equipped with one or more heaters capable of brining the asphalt emulsion to spray application temperature. The tank shall have a full circulating system with an engine-driven pump. The circulating system shall include the spray bar unit. The truck shall also be equipped with a hand-spray for applying the emulsion to areas that cannot be reached with the spray bar.

The distributor shall be equipped with charts for determining the discharge for each nozzle size, the proper truck speeds for various application rates, and the corrections for temperature-viscosity variations.

4.6(e) AGGREGATE SPREADER: The aggregate spreader used shall be a self-propelled flarity or equal capable of uniformly spreading aggregate at varying application rates as required. The aggregate spreader shall be equipped with a tachometer and/or a speedometer to ensure the maintenance of a uniform spreader speed. The aggregate spreader shall also be equipped with a device and so operated that the coarse particles of the screenings shall be deposited on the bituminous binder before the finer particles.

4.6(f) ROLLERS: There shall be at least two self-propelled, smooth-tread, pneumatic tired rollers on the job during chipping operations. Each roller shall weigh at least ten tons, have staggered (off-set) front and rear tires so the rear tires shall be uniform and inflated to 50 psi. No steel wheel rollers shall be used to roll chip seal surface treatments, no shall rolling speed exceed 10 mph.

4.6(g) TRUCKS: Enough trucks must be available to ensure that the operation can proceed without interruption. Frequent stops and starts will not be permitted.

4.6(h) CONSTRUCTION METHODS: The contractor shall thoroughly remove all dust, dirt, tracked on clay and foreign material from the surfaces to be sealed by sweeping the surface with power brooms, hand brooms, power blowers, or by flushing it with water or a combination of the above. All patching, crack filling and drainage improvements shall be completed prior to

the commencement of the surface treatment project. After the cleaning operation has been completed, and prior to the application of the surface treatment, the area to be treated will be inspected by the Project Engineer to determine it's fitness for receiving the surface treatment.

Application of the asphalt shall not be permitted to begin until the loaded aggregate trucks are in place and ready to apply the cover aggregate. The bituminous material shall be so applied that uniform distribution in the quantities specified is obtained over all points of the surface to be treated.

All lightly-coated areas and spots missed by the distributor shall be properly treated with bituminous material applied by hand.

No more asphalt shall be applied than can be covered with aggregate in 30 seconds or less. Distances between the distributor and chip-spreader shall be as close as possible, but in no case shall the chip-spreader be greater than 50 feet behind the distributor during the chipping operations.

Immediately following the application of the bituminous material, the aggregate shall be spread uniformly over the surface in the quantities specified. The aggregate shall be spread by using a self-propelled spreader (flarity or equal). The aggregate shall be spread evenly by hand on all areas missed by the aggregate spreader. Back-spotting or sprinkling of additional aggregate over the areas having insufficient cover shall be done by hand and shall be continued during the operations whenever necessary.

As the distributor moves forward to spray the asphalt, the aggregate spreader shall start right behind it, spreading the chips uniformly and at the specified rate. The asphalt distributor shall travel at the same rate of speed as the chip spreader and in no case shall the two machines be separated by more than 50 feet during the sealing process.
Operating the chip spreader at speeds which cause the chips to roll over after striking the bituminous-covered surface will not be permitted.

Excess aggregate deposited in localized areas shall be immediately remove with square end shovels, and in areas

where application is insufficient, additional aggregate shall be added by hand. The treated surface shall be rolled with rubber-tired rollers immediately after the distribution of the cover aggregate, and shall continue until the aggregate is properly seated in the binder. Rollers shall proceed in the longitudinal direction, working across the treated surface until the entire width and length of the treated surface has been rolled at least four times. Rollers and gravel trucks shall not be operated at speeds great enough to kick up chips, and in no case shall rollers be operated above 10 miles per hour. In all places not accessible to the rollers, the aggregate shall be adequately compacted with hand tampers. Any aggregate that becomes coated or mixed with dirt or any other foreign material shall be removed, replaced with clean aggregate over a newly sprayed surface and then re-rolled, as directed by the Project Engineer.

Bituminous material and chips shall not be spread more than 100 feet ahead of completion of initial rolling operations.

To eliminate excessive ridging, all joint edges shall be swept prior to the application of the second course of aggregate on double chip seal treatments.

Upon completion of rolling, traffic will be allowed to use the streets at a speed not to exceed 15 miles per hour for a period of not less than 24 hours. After the chips are set in the bituminous binder, but not earlier than the following day, any loose chips forming corrugations shall be distributed over the surface. At the end of seven days any excess chips shall be removed in such a manner that the aggregate set in the binder will not be displaced. Excessive rolling and brooming will not be permitted.
After the surface has been opened to traffic, any excess bituminous binder that comes to the surface shall be immediately covered with additional chips or clean sand. The completed surface shall present a uniform appearance and shall be thoroughly compacted and free from ruts, humps, depressions or irregularities due to an uneven distribution of bituminous binder or chips.

4.6(i) WEATHER LIMITATIONS: The chip seal shall be placed only when the air temperature in the shade of the road bed temperature is above 75··F. The chip seal shall not be placed

when the temperature of the road surface is above 130··F, during rainy weather, when the base is wet or during other unfavorable weather conditions as determined by the Project Engineer.